



Full wwPDB X-ray Structure Validation Report ⓘ

Aug 2, 2022 – 06:05 PM EDT

PDB ID : 7SUE
Title : Crystal Structure of Human Fab S24-188 in the complex with the N-terminal Domain of Nucleocapsid protein from SARS CoV-2
Authors : Kim, Y.; Maltseva, N.; Tesar, C.; Jedrzejczak, R.; Dugan, H.; Stamper, C.; Wilson, P.; Joachimiak, A.; Center for Structural Genomics of Infectious Diseases (CSGID)
Deposited on : 2021-11-17
Resolution : 2.90 Å(reported)

This is a Full wwPDB X-ray Structure Validation Report for a publicly released PDB entry.

We welcome your comments at validation@mail.wwpdb.org

A user guide is available at

<https://www.wwpdb.org/validation/2017/XrayValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at <http://www.wwpdb.org/validation/2017/FAQs#types>.

The following versions of software and data (see [references ⓘ](#)) were used in the production of this report:

MolProbity : 4.02b-467
Xtriage (Phenix) : 1.13
EDS : 2.29
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac : 5.8.0158
CCP4 : 7.0.044 (Gargrove)
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.29

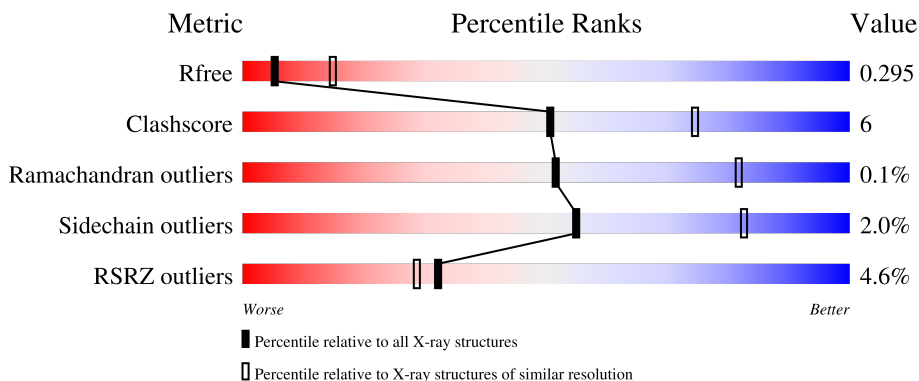
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

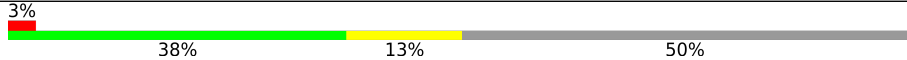
The reported resolution of this entry is 2.90 Å.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.



Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	130704	1957 (2.90-2.90)
Clashscore	141614	2172 (2.90-2.90)
Ramachandran outliers	138981	2115 (2.90-2.90)
Sidechain outliers	138945	2117 (2.90-2.90)
RSRZ outliers	127900	1906 (2.90-2.90)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments of the lower bar indicate the fraction of residues that contain outliers for ≥ 3 , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions $\leq 5\%$. The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density. The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	216	
1	E	216	
1	G	216	
1	L	216	
2	B	231	

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Mol	Chain	Length	Quality of chain
2	F	231	<p>3% 46% 10% 44%</p>
2	H	231	<p>83% 14% ..</p>
2	I	231	<p>6% 46% 9% 45%</p>
3	C	130	<p>5% 76% 12% • 12%</p>
3	D	130	<p>2% 72% 16% 12%</p>
3	J	130	<p>11% 75% 13% 12%</p>
3	K	130	<p>9% 72% 16% • 12%</p>

2 Entry composition [i](#)

There are 3 unique types of molecules in this entry. The entry contains 13707 atoms, of which 0 are hydrogens and 0 are deuteriums.

In the tables below, the ZeroOcc column contains the number of atoms modelled with zero occupancy, the AltConf column contains the number of residues with at least one atom in alternate conformation and the Trace column contains the number of residues modelled with at most 2 atoms.

- Molecule 1 is a protein called S24-188 Fab Light chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	L	212	1577	984	263	325	5	0	0	0
1	A	212	1577	984	263	325	5	0	0	0
1	E	109	799	495	133	168	3	0	0	0
1	G	109	799	495	133	168	3	0	0	0

- Molecule 2 is a protein called S24-188 Fab Heavy chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
2	H	227	1699	1076	283	331	9	0	0	0
2	B	227	1699	1076	283	331	9	0	0	0
2	F	129	995	630	167	192	6	0	0	0
2	I	128	983	623	166	188	6	0	0	0

- Molecule 3 is a protein called Nucleoprotein.

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
			Total	C	N	O			
3	C	115	896	571	156	169	0	0	0
3	D	115	896	571	156	169	0	0	0
3	J	114	891	567	158	166	0	0	0
3	K	115	896	571	156	169	0	0	0

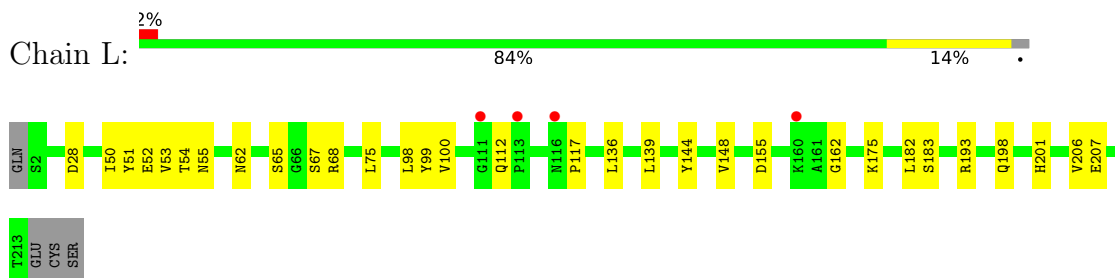
There are 12 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
C	44	SER	-	expression tag	UNP P0DTC9
C	45	ASN	-	expression tag	UNP P0DTC9
C	46	MET	-	expression tag	UNP P0DTC9
D	44	SER	-	expression tag	UNP P0DTC9
D	45	ASN	-	expression tag	UNP P0DTC9
D	46	MET	-	expression tag	UNP P0DTC9
J	44	SER	-	expression tag	UNP P0DTC9
J	45	ASN	-	expression tag	UNP P0DTC9
J	46	MET	-	expression tag	UNP P0DTC9
K	44	SER	-	expression tag	UNP P0DTC9
K	45	ASN	-	expression tag	UNP P0DTC9
K	46	MET	-	expression tag	UNP P0DTC9

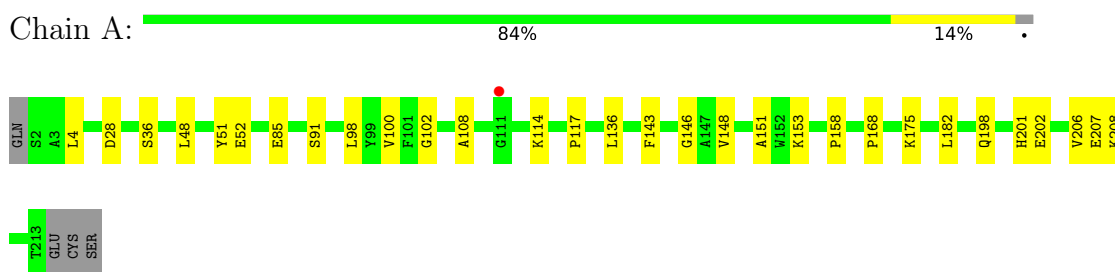
3 Residue-property plots

These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. A red dot above a residue indicates a poor fit to the electron density ($RSRZ > 2$). Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

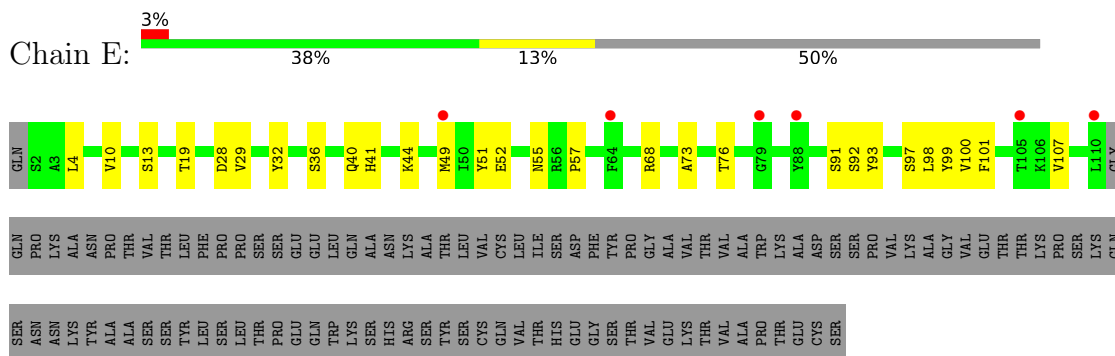
- Molecule 1: S24-188 Fab Light chain



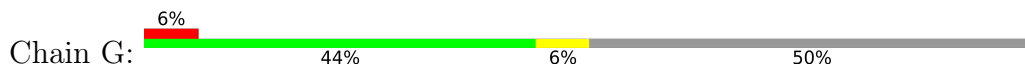
- Molecule 1: S24-188 Fab Light chain



- Molecule 1: S24-188 Fab Light chain

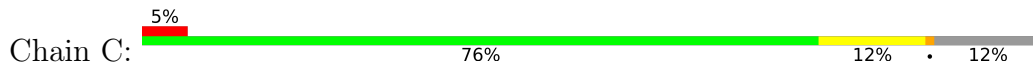


- Molecule 1: S24-188 Fab Light chain



GLY	PRO	VAL	PHE	PRO	LEU	ALA	PRO	CYS	SER	ARG	SER	THR	GLY	GLY	THR	ALA	LEU	GLY	CYS	VAL	GLY	ASN	GLY	GLY	VAL	VAL	LYS	ASP	TYR	PHE	LYS	PRO	GLU	PRO	THR	THR	GLY	VAL	HIS	THR	PHE	PRO	ALA	VAL	GLN	SER	SER	GLY	LEU	TYR	SER
LEU	SER	VAL	VAL	THR	PRO	SER	SER	SER	LEU	GLY	THR	GLN	THR	TYR	ILE	CYS	ASN	VAL	ASN	ASN	HIS	LYS	PRO	SER	ASN	ASP	TYR	LYS	VAL	PRO	VAL	ASP	LYS	VAL	VAL	GLU	VAL	PRO	LYS												

● Molecule 3: Nucleoprotein



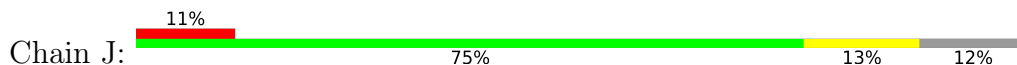
SER	ASN	MET	N47	A55	L56	T57	L64	R68	S78	D82	Y87	T91	ARG	ARG	ILE	ARG	GLY	GLY	ASP	GLY	LYS	MET	LYS	D103	R107	W108	Y109	E118	L121	I130	I131	L139	M140	K143	L159	Q160	L161	T165	G170	F171	Y172	ALA
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● Molecule 3: Nucleoprotein



SER	ASN	MET	N47	F53	T54	A55	H59	L64	R68	P73	I74	M75	D82	Y87	ARG	ARG	ILE	ARG	GLY	GLY	ASP	GLY	LYS	D103	R107	W108	Y109	F110	G114	Y123	W132	P142	K143	R149	M154	L159	Q163	G170
F171	Y172	ALA																																				

● Molecule 3: Nucleoprotein



SER	ASN	MET	N47	A55	Q58	H59	L64	K65	F66	P67	R68	G69	Q70	G71	V72	N77	D82	Y86	Y87	T91	R92	ARG	ILE	ARG	GLY	GLY	ASP	GLY	LYS	MET	LYS	ASP	LEU	S105	P106	Y112	E118	L121	P122	Y123	I131	W132	V133	A134	T135	E136	G137
N140	P162	Q163	K169	Y172	ALA																																										

● Molecule 3: Nucleoprotein



SER	ASN	MET	N47	A55	L56	T57	Q58	H59	G60	K61	F66	P67	R68	V72	D82	Q83	Y87	R88	R89	A90	T91	ARG	ARG	ILE	ARG	GLY	GLY	ASP	GLY	LYS	MET	LYS	D103	L104	S105	P106	R107	W108	Y109	Y112	E118	L121	M126	G129	T135	L139
L161	T166	G170	F171	Y172	ALA																																									

4 Data and refinement statistics i

Property	Value	Source
Space group	P 1	Depositor
Cell constants a, b, c, α , β , γ	71.31Å 78.50Å 127.15Å 97.60° 89.96° 90.02°	Depositor
Resolution (Å)	39.20 – 2.90 39.20 – 2.90	Depositor EDS
% Data completeness (in resolution range)	91.5 (39.20-2.90) 91.3 (39.20-2.90)	Depositor EDS
R_{merge}	0.09	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.60 (at 2.90Å)	Xtrriage
Refinement program	PHENIX 1.19_4092	Depositor
R, R_{free}	0.262 , 0.292 0.265 , 0.295	Depositor DCC
R_{free} test set	2724 reflections (4.92%)	wwPDB-VP
Wilson B-factor (Å ²)	89.1	Xtrriage
Anisotropy	0.506	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.25 , 26.9	EDS
L-test for twinning ²	$\langle L \rangle = 0.47$, $\langle L^2 \rangle = 0.30$	Xtrriage
Estimated twinning fraction	0.440 for h,-k,-l	Xtrriage
F_o, F_c correlation	0.93	EDS
Total number of atoms	13707	wwPDB-VP
Average B, all atoms (Å ²)	119.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 5.67% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

²Theoretical values of $\langle |L| \rangle$, $\langle L^2 \rangle$ for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

5 Model quality [i](#)

5.1 Standard geometry [i](#)

The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 5$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z >5	RMSZ	# Z >5
1	A	0.26	0/1615	0.48	0/2205
1	E	0.25	0/816	0.49	0/1111
1	G	0.27	0/816	0.50	0/1111
1	L	0.26	0/1615	0.48	0/2205
2	B	0.25	0/1740	0.49	0/2366
2	F	0.25	0/1018	0.54	0/1379
2	H	0.27	0/1740	0.51	0/2366
2	I	0.28	0/1006	0.51	0/1361
3	C	0.25	0/923	0.52	0/1261
3	D	0.24	0/923	0.49	0/1261
3	J	0.25	0/918	0.51	0/1253
3	K	0.27	0/923	0.57	0/1261
All	All	0.26	0/14053	0.50	0/19140

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts [i](#)

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry-related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	1577	0	1519	17	0
1	E	799	0	755	18	0
1	G	799	0	755	12	0
1	L	1577	0	1519	17	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	B	1699	0	1663	12	0
2	F	995	0	961	16	0
2	H	1699	0	1663	23	0
2	I	983	0	951	14	0
3	C	896	0	855	11	0
3	D	896	0	855	13	0
3	J	891	0	853	11	0
3	K	896	0	855	13	0
All	All	13707	0	13204	154	0

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 6.

All (154) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:K:72:VAL:HG11	3:K:83:GLN:HB3	1.81	0.61
2:H:6:GLN:H	2:H:122:GLN:HE22	1.49	0.59
2:I:41:PRO:HD3	2:I:92:ALA:HA	1.84	0.59
1:E:51:TYR:CZ	1:E:55:ASN:HB3	2.38	0.59
3:J:118:GLU:HB3	3:J:121:LEU:HD22	1.85	0.58
1:G:32:TYR:O	1:G:68:ARG:NH1	2.35	0.58
2:I:60:TYR:HE1	2:I:70:ILE:HG12	1.68	0.58
2:H:109:ARG:HD3	3:C:68:ARG:HD3	1.83	0.58
3:K:118:GLU:HB3	3:K:121:LEU:HD22	1.84	0.58
2:H:68:VAL:HG22	2:H:83:LEU:HD13	1.86	0.57
2:F:109:ARG:HD3	3:J:136:GLU:HG2	1.86	0.57
1:G:37:TRP:HB2	1:G:50:ILE:HB	1.87	0.57
3:K:58:GLN:HB3	3:K:106:PRO:HG2	1.85	0.56
2:H:48:MET:HG2	2:H:64:PHE:CE2	2.41	0.56
2:H:212:ILE:HG22	2:H:227:LYS:HA	1.87	0.56
3:K:57:THR:OG1	3:K:59:HIS:NE2	2.39	0.55
2:B:48:MET:HG2	2:B:64:PHE:CE2	2.42	0.55
2:I:40:ALA:HB3	2:I:43:GLN:HB2	1.88	0.55
3:K:89:ARG:HE	3:K:129:GLY:HA2	1.72	0.54
3:D:82:ASP:HA	3:D:143:LYS:HE3	1.88	0.54
2:B:176:LEU:HD21	2:B:199:VAL:HG11	1.90	0.54
1:G:68:ARG:HA	1:G:73:ALA:HA	1.89	0.53
1:G:49:MET:O	1:G:57:PRO:HD2	2.08	0.53
3:D:73:PRO:HB3	3:D:159:LEU:HG	1.89	0.53
3:J:72:VAL:HG11	3:J:135:THR:HG23	1.90	0.53

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:136:LEU:HD12	1:A:182:LEU:HD23	1.89	0.53
3:C:118:GLU:HB3	3:C:121:LEU:HD22	1.90	0.53
3:K:88:ARG:HH12	3:K:91:THR:HB	1.74	0.53
1:A:198:GLN:HG2	1:A:207:GLU:HG2	1.91	0.53
3:C:87:TYR:HB2	3:C:131:ILE:HG13	1.91	0.53
2:F:6:GLN:H	2:F:122:GLN:HE22	1.56	0.52
3:D:149:ARG:NH1	3:D:154:ASN:O	2.43	0.52
1:E:32:TYR:O	1:E:68:ARG:NH1	2.43	0.52
1:G:57:PRO:HB3	2:I:113:TYR:CE2	2.44	0.51
2:I:106:SER:HA	3:K:139:LEU:HA	1.92	0.51
2:H:107:TYR:OH	2:H:109:ARG:NH1	2.43	0.51
2:B:6:GLN:H	2:B:122:GLN:HE22	1.58	0.51
2:B:109:ARG:HD2	3:D:68:ARG:HB2	1.93	0.51
3:K:55:ALA:HB2	3:K:109:TYR:HE1	1.75	0.51
3:C:82:ASP:HA	3:C:143:LYS:HD2	1.92	0.51
2:B:97:ALA:HB1	2:B:117:MET:HB3	1.94	0.50
1:A:48:LEU:HD21	1:A:51:TYR:HB3	1.92	0.50
3:D:55:ALA:HB2	3:D:109:TYR:HE1	1.75	0.50
3:J:72:VAL:HG22	3:J:133:VAL:HB	1.94	0.50
2:H:182:THR:HA	2:H:197:SER:HA	1.94	0.50
3:D:55:ALA:HB1	3:D:107:ARG:HB3	1.92	0.49
2:B:36:TRP:CE2	2:B:81:MET:HB2	2.47	0.49
2:F:107:TYR:HD2	3:J:137:GLY:H	1.60	0.49
3:K:67:PRO:HD2	3:K:166:THR:HG21	1.93	0.49
2:H:222:THR:HG23	1:A:208:LYS:HE2	1.93	0.49
1:L:50:ILE:HG22	1:L:52:GLU:O	2.13	0.48
1:G:51:TYR:CG	2:I:113:TYR:HD2	2.31	0.48
1:L:148:VAL:HG12	1:L:201:HIS:HB2	1.94	0.48
2:F:40:ALA:HB3	2:F:43:GLN:HB2	1.94	0.48
2:B:2:VAL:HG22	2:B:26:GLY:HA3	1.95	0.48
1:E:4:LEU:HD11	1:E:100:VAL:HG23	1.95	0.48
1:E:36:SER:HB2	1:E:91:SER:OG	2.14	0.48
2:I:102:PHE:HE1	2:I:107:TYR:HA	1.78	0.48
2:H:6:GLN:H	2:H:122:GLN:NE2	2.11	0.48
1:E:98:LEU:HD13	2:F:61:ALA:HA	1.94	0.48
2:F:33:ALA:O	2:F:99:GLY:N	2.46	0.48
2:I:29:PHE:HD2	2:I:74:LYS:HA	1.79	0.48
1:A:117:PRO:HA	1:A:143:PHE:HB3	1.95	0.48
2:B:136:PRO:HB3	2:B:162:TYR:HB3	1.96	0.47
1:E:49:MET:O	1:E:57:PRO:HD2	2.14	0.47
1:L:162:GLY:O	1:L:183:SER:N	2.34	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:E:10:VAL:HG13	1:E:107:VAL:HG23	1.96	0.47
2:H:165:GLU:HB2	2:H:193:TYR:HE2	1.79	0.47
1:A:153:LYS:HD3	1:A:198:GLN:OE1	2.14	0.47
1:G:51:TYR:HD1	1:G:57:PRO:HD3	1.79	0.47
1:L:99:TYR:HB2	2:H:47:TRP:CG	2.50	0.47
1:A:114:LYS:NZ	1:A:202:GLU:OE1	2.43	0.47
1:A:153:LYS:HG2	1:A:158:PRO:HA	1.97	0.47
3:K:88:ARG:NH1	3:K:91:THR:HB	2.29	0.47
1:E:19:THR:HG22	1:E:76:THR:HG22	1.97	0.47
1:G:31:GLY:O	3:K:126:ASN:N	2.31	0.47
3:K:72:VAL:HG21	3:K:135:THR:HG23	1.96	0.46
3:C:57:THR:HG22	3:C:107:ARG:HG2	1.97	0.46
3:D:87:TYR:CE2	3:D:110:PHE:HB2	2.49	0.46
1:A:136:LEU:HB2	1:A:182:LEU:HB3	1.98	0.46
1:L:139:LEU:HB3	2:H:183:PHE:CZ	2.50	0.46
3:C:161:LEU:HB2	3:C:165:THR:HG21	1.97	0.46
3:D:53:PHE:HZ	3:D:75:ASN:HB2	1.81	0.45
1:E:51:TYR:CD2	1:E:52:GLU:HG2	2.51	0.45
1:L:98:LEU:HB2	2:H:47:TRP:CZ3	2.51	0.45
1:A:51:TYR:CD2	1:A:52:GLU:HG2	2.52	0.45
1:E:49:MET:N	1:E:49:MET:SD	2.89	0.45
2:H:165:GLU:HB2	2:H:193:TYR:CE2	2.52	0.45
3:D:59:HIS:N	3:D:170:GLY:O	2.49	0.45
2:H:106:SER:HA	3:C:139:LEU:HA	1.98	0.45
3:D:123:TYR:CE2	3:D:132:TRP:HB3	2.52	0.45
1:E:40:GLN:NE2	2:F:39:GLN:OE1	2.39	0.44
3:D:55:ALA:HB2	3:D:109:TYR:CE1	2.51	0.44
1:L:54:THR:HG22	1:L:67:SER:HA	1.98	0.44
2:I:51:ILE:HD13	2:I:58:ALA:HB2	2.00	0.44
2:H:102:PHE:CE1	3:C:140:ASN:HB2	2.53	0.43
3:C:118:GLU:HG3	3:C:130:ILE:HD11	1.99	0.43
3:J:58:GLN:HB3	3:J:106:PRO:HG2	2.00	0.43
1:E:68:ARG:HA	1:E:73:ALA:HA	2.00	0.43
2:F:60:TYR:CE1	2:F:70:ILE:HG12	2.53	0.43
2:F:102:PHE:CE2	3:J:140:ASN:HB2	2.53	0.43
2:H:91:THR:HG23	2:H:127:THR:HA	1.98	0.43
2:I:68:VAL:HA	2:I:82:GLU:O	2.19	0.43
1:L:53:VAL:HG21	1:L:68:ARG:NH2	2.34	0.43
2:H:31:SER:H	2:H:54:ILE:HG21	1.83	0.43
2:F:19:LYS:HA	2:F:81:MET:O	2.18	0.43
2:F:111:ASP:OD1	3:J:68:ARG:NH1	2.52	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:J:82:ASP:N	3:J:82:ASP:OD1	2.51	0.43
3:J:86:TYR:HB3	3:J:132:TRP:CE3	2.54	0.43
1:L:136:LEU:HD12	1:L:182:LEU:HD23	2.00	0.43
1:A:148:VAL:HG12	1:A:201:HIS:HB2	2.01	0.43
1:L:117:PRO:HG2	1:L:206:VAL:HG11	2.01	0.43
3:C:82:ASP:OD1	3:C:82:ASP:N	2.49	0.43
3:D:114:GLY:HA3	3:D:142:PRO:HB3	2.00	0.43
1:E:99:TYR:HB2	2:F:47:TRP:CD2	2.54	0.43
1:L:52:GLU:HB2	1:L:55:ASN:HB2	2.01	0.43
3:K:82:ASP:N	3:K:82:ASP:OD1	2.50	0.43
2:H:136:PRO:HB3	2:H:162:TYR:HB3	2.00	0.42
1:L:65:SER:O	1:L:75:LEU:HD12	2.19	0.42
1:A:36:SER:OG	1:A:91:SER:OG	2.36	0.42
3:J:87:TYR:HB2	3:J:131:ILE:HG13	2.02	0.42
1:L:51:TYR:CD2	2:H:113:TYR:CD1	3.07	0.42
1:E:28:ASP:O	1:E:92:SER:OG	2.26	0.42
1:L:112:GLN:HB3	1:L:144:TYR:CE2	2.55	0.42
2:B:139:PHE:HE2	2:B:160:LYS:HE2	1.85	0.42
1:G:6:GLN:HE21	1:G:22:CYS:HB2	1.84	0.42
1:G:51:TYR:CD2	2:I:113:TYR:HD2	2.38	0.42
1:L:198:GLN:HG2	1:L:207:GLU:HG2	2.02	0.41
2:H:97:ALA:HB1	2:H:117:MET:HB3	2.02	0.41
1:E:91:SER:HB3	1:E:101:PHE:CE1	2.54	0.41
1:E:93:TYR:CZ	1:E:97:SER:HA	2.55	0.41
2:I:109:ARG:HA	2:I:112:TYR:HB2	2.01	0.41
1:L:155:ASP:OD1	1:L:193:ARG:HB2	2.20	0.41
1:A:85:GLU:HG2	1:A:108:ALA:HA	2.01	0.41
1:A:151:ALA:HB3	1:A:198:GLN:HE21	1.85	0.41
1:E:41:HIS:HB2	1:E:44:LYS:HB3	2.02	0.41
3:D:163:GLN:OE1	3:D:163:GLN:N	2.40	0.41
1:G:51:TYR:CD2	1:G:52:GLU:HG2	2.55	0.41
2:F:28:THR:HB	2:F:98:ARG:HH12	1.85	0.41
2:I:86:LEU:HB3	2:I:128:VAL:HG21	2.02	0.41
1:A:146:GLY:O	1:A:168:PRO:HG3	2.21	0.41
1:E:28:ASP:OD1	1:E:29:VAL:HG22	2.21	0.41
1:L:62:ASN:N	1:L:62:ASN:OD1	2.53	0.41
2:B:165:GLU:HG3	2:B:166:PRO:HA	2.02	0.41
2:F:50:ARG:HG2	2:F:51:ILE:N	2.36	0.41
2:H:176:LEU:HD21	2:H:199:VAL:HG21	2.03	0.41
3:C:55:ALA:HB2	3:C:109:TYR:HE1	1.86	0.41
1:A:4:LEU:HB2	1:A:102:GLY:HA2	2.03	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:F:109:ARG:O	2:F:109:ARG:HG2	2.20	0.40
2:H:213:CYS:SG	2:H:226:LYS:HB3	2.61	0.40
1:A:98:LEU:HB2	2:B:47:TRP:CZ3	2.56	0.40
2:F:60:TYR:HE1	2:F:70:ILE:HG12	1.85	0.40
2:B:201:VAL:HG22	2:B:202:PRO:HD2	2.02	0.40
1:G:40:GLN:NE2	2:I:39:GLN:OE1	2.35	0.40

There are no symmetry-related clashes.

5.3 Torsion angles [i](#)

5.3.1 Protein backbone [i](#)

In the following table, the Percentiles column shows the percent Ramachandran outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

The Analysed column shows the number of residues for which the backbone conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	210/216 (97%)	206 (98%)	4 (2%)	0	100	100
1	E	107/216 (50%)	103 (96%)	4 (4%)	0	100	100
1	G	107/216 (50%)	103 (96%)	4 (4%)	0	100	100
1	L	210/216 (97%)	206 (98%)	4 (2%)	0	100	100
2	B	221/231 (96%)	216 (98%)	5 (2%)	0	100	100
2	F	125/231 (54%)	118 (94%)	7 (6%)	0	100	100
2	H	221/231 (96%)	217 (98%)	4 (2%)	0	100	100
2	I	124/231 (54%)	118 (95%)	6 (5%)	0	100	100
3	C	111/130 (85%)	109 (98%)	2 (2%)	0	100	100
3	D	111/130 (85%)	109 (98%)	2 (2%)	0	100	100
3	J	110/130 (85%)	109 (99%)	1 (1%)	0	100	100
3	K	111/130 (85%)	107 (96%)	3 (3%)	1 (1%)	17	48
All	All	1768/2308 (77%)	1721 (97%)	46 (3%)	1 (0%)	51	82

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
3	K	89	ARG

5.3.2 Protein sidechains [i](#)

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

The Analysed column shows the number of residues for which the sidechain conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	178/183 (97%)	174 (98%)	4 (2%)	52	81
1	E	89/183 (49%)	88 (99%)	1 (1%)	73	92
1	G	89/183 (49%)	89 (100%)	0	100	100
1	L	178/183 (97%)	175 (98%)	3 (2%)	60	86
2	B	188/192 (98%)	182 (97%)	6 (3%)	39	73
2	F	105/192 (55%)	103 (98%)	2 (2%)	57	84
2	H	188/192 (98%)	181 (96%)	7 (4%)	34	68
2	I	103/192 (54%)	101 (98%)	2 (2%)	57	84
3	C	92/103 (89%)	91 (99%)	1 (1%)	73	92
3	D	92/103 (89%)	92 (100%)	0	100	100
3	J	91/103 (88%)	90 (99%)	1 (1%)	73	92
3	K	92/103 (89%)	90 (98%)	2 (2%)	52	81
All	All	1485/1912 (78%)	1456 (98%)	29 (2%)	55	82

All (29) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	L	28	ASP
1	L	100	VAL
1	L	175	LYS
2	H	29	PHE
2	H	50	ARG
2	H	54	ILE
2	H	102	PHE
2	H	108	TYR
2	H	109	ARG
2	H	206	LEU

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Mol	Chain	Res	Type
1	A	28	ASP
1	A	100	VAL
1	A	175	LYS
1	A	206	VAL
2	B	29	PHE
2	B	50	ARG
2	B	54	ILE
2	B	102	PHE
2	B	108	TYR
2	B	206	LEU
3	C	68	ARG
1	E	13	SER
2	F	74	LYS
2	F	87	ARG
2	I	87	ARG
2	I	109	ARG
3	J	91	THR
3	K	61	LYS
3	K	68	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (6) such sidechains are listed below:

Mol	Chain	Res	Type
1	L	39	GLN
1	L	40	GLN
2	H	39	GLN
1	G	6	GLN
3	J	126	ASN
3	K	126	ASN

5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

5.4 Non-standard residues in protein, DNA, RNA chains [i](#)

There are no non-standard protein/DNA/RNA residues in this entry.

5.5 Carbohydrates [i](#)

There are no monosaccharides in this entry.

5.6 Ligand geometry [i](#)

There are no ligands in this entry.

5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

6 Fit of model and data [i](#)

6.1 Protein, DNA and RNA chains [i](#)

In the following table, the column labelled ‘#RSRZ > 2’ contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 95th percentile and maximum values of the occupancy-weighted average B-factor per residue. The column labelled ‘Q < 0.9’ lists the number of (and percentage) of residues with an average occupancy less than 0.9.

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å ²)	Q<0.9
1	A	212/216 (98%)	0.08	1 (0%) 91 91	88, 108, 126, 134	0
1	E	109/216 (50%)	0.40	6 (5%) 25 21	116, 135, 146, 152	0
1	G	109/216 (50%)	0.60	13 (11%) 4 3	125, 142, 156, 170	0
1	L	212/216 (98%)	0.14	4 (1%) 66 65	83, 107, 128, 147	0
2	B	227/231 (98%)	0.08	1 (0%) 92 93	87, 99, 122, 136	0
2	F	129/231 (55%)	0.47	8 (6%) 20 16	118, 139, 158, 167	0
2	H	227/231 (98%)	0.09	1 (0%) 92 93	83, 100, 117, 130	0
2	I	128/231 (55%)	0.38	13 (10%) 6 5	106, 141, 165, 178	0
3	C	115/130 (88%)	0.39	7 (6%) 21 17	94, 112, 147, 157	0
3	D	115/130 (88%)	0.08	3 (2%) 56 52	87, 96, 123, 150	0
3	J	114/130 (87%)	0.62	14 (12%) 4 3	115, 144, 166, 171	0
3	K	115/130 (88%)	0.60	12 (10%) 6 5	113, 140, 176, 197	0
All	All	1812/2308 (78%)	0.27	83 (4%) 32 29	83, 116, 154, 197	0

All (83) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	G	12	GLY	7.7
2	I	129	SER	6.6
3	K	104	LEU	6.1
3	J	71	GLY	5.8
3	J	123	TYR	5.5
1	E	110	LEU	5.4
3	K	68	ARG	5.4
3	J	169	LYS	5.1
3	K	172	TYR	5.1
3	C	170	GLY	4.7
1	G	65	SER	4.4

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Mol	Chain	Res	Type	RSRZ
3	K	55	ALA	4.3
3	J	64	LEU	4.3
2	I	130	SER	4.2
2	F	54	ILE	4.2
3	K	170	GLY	4.1
2	F	119	VAL	4.0
1	G	80	LEU	3.8
2	F	94	TYR	3.7
1	L	111	GLY	3.6
1	E	64	PHE	3.5
3	D	64	LEU	3.4
1	G	64	PHE	3.4
3	K	108	TRP	3.4
2	I	55	LEU	3.4
1	G	88	TYR	3.3
1	E	105	THR	3.2
3	J	59	HIS	3.2
1	G	49	MET	3.1
1	L	116	ASN	3.0
2	I	94	TYR	3.0
1	G	108	ALA	3.0
3	C	68	ARG	3.0
2	B	1	GLN	3.0
3	K	112	TYR	2.9
1	E	49	MET	2.9
3	K	103	ASP	2.9
3	C	172	TYR	2.9
3	J	163	GLN	2.8
1	G	8	ALA	2.8
1	G	19	THR	2.7
3	K	87	TYR	2.7
1	A	111	GLY	2.7
3	K	66	PHE	2.7
1	G	48	LEU	2.7
3	J	112	TYR	2.6
1	E	79	GLY	2.6
2	I	74	LYS	2.6
3	J	65	LYS	2.6
3	J	66	PHE	2.6
2	F	57	ILE	2.6
2	I	72	ALA	2.6
3	J	55	ALA	2.5

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Mol	Chain	Res	Type	RSRZ
2	I	120	TRP	2.5
3	K	161	LEU	2.5
1	G	15	GLY	2.5
2	I	95	TYR	2.5
3	C	160	GLN	2.5
3	D	91	THR	2.5
2	I	119	VAL	2.5
2	F	109	ARG	2.4
1	E	88	TYR	2.4
3	D	172	TYR	2.4
3	C	159	LEU	2.4
2	F	24	ALA	2.3
3	K	90	ALA	2.3
3	J	77	ASN	2.3
1	L	160	LYS	2.3
2	F	74	LYS	2.3
3	J	162	PRO	2.3
1	G	18	ILE	2.3
2	F	12	LYS	2.3
2	I	117	MET	2.2
3	J	92	ARG	2.2
2	I	113	TYR	2.2
3	C	78	SER	2.1
2	I	108	TYR	2.1
1	G	89	TYR	2.1
3	C	64	LEU	2.1
1	L	113	PRO	2.0
3	J	70	GLN	2.0
2	H	1	GLN	2.0
2	I	54	ILE	2.0

6.2 Non-standard residues in protein, DNA, RNA chains [\(i\)](#)

There are no non-standard protein/DNA/RNA residues in this entry.

6.3 Carbohydrates [\(i\)](#)

There are no monosaccharides in this entry.

6.4 Ligands

There are no ligands in this entry.

6.5 Other polymers

There are no such residues in this entry.